APPENDIX A

Partial Translation of the Related portions of
Japanese-Utility Model Application Laid-Open No.05-8900
published on February 5, 1993
"A Dimmer of A Cold-cathode Tube"
(Paragraphs [0010]-[0014])

[0010]

FIG. 1 shows a block diagram of a dimmer of a cold-cathode tube which is an Example of the present utility model. Setting of a luminance of a cold-cathode tube 4 is performed in a volume 9 connected to a controller 7'. A pulse of duty corresponding to a preset value of the volume 9 is output by a duty conversion circuit 10'. Then, this output pulse is converted into AC (alternate current) in a DC-AC converter 11, and then, this AC is applied to the cold-cathode tube 4, thereby emitting a light. Meanwhile, as shown in FIG.2, an optical sensor 13 comprised of CdS cells etc. is provided in the vicinity of the cold-cathode tube 4, more specifically, is attached in a hole 3a which is provided in a part of a light reflecting plate 3 arranged behind the cold-cathode tube 4. And then, the optical sensor 13 is connected to the controller 7' and always detects a luminance of the cold-cathode tube 4.

[0011]

In this state, the output pulse from the duty conversion circuit 10' may be set to be 50 % of the duty so as to obtain 50 % of the maximal luminance at usual time when the temperature of the cold-cathode tube 4 is approximately 50 ℃. However, at the time of the start at an ambient temperature, only 80 % of the luminance at usual time can be obtained. That is, only 40 % of the maximal luminance can be obtained with 50 % of the duty. Here, while detecting this luminance by the optical sensor 13, the duty of the output pulse is increased to be 60 % so as to obtain 50 % of the preset luminance. After that, when the luminance increases in accordance with the increase in the temperature of the cold-cathode tube 4, the optical sensor 13 detects this state, and then, the duty is decreased to become 50 % of the luminance. When the temperature further increases to be the usual state, the output pulse is defined to be 50 % of the duty.

[0012]

The series of the operations will be described in detail below with

reference to the flowchart shown in FIG.3. Furthermore, the duty conversion circuit of the present Example has resolution ability of 8 bits and can divide the duty of the output pulse into 255. Once the present dimmer is activated, the preset initial value, timing control for executing a program every defined time, and a luminance preset value input by the volume 9 are read. Moreover, setting of the duty value of the output pulse corresponding to the luminance preset value is performed. Next, an input value from the optical sensor 13 is read, and then, it is judged whether or not the preset luminance is higher than an actual luminance (S1). When the actual luminance is lower than the preset luminance, then, it is judged whether or not the preset value of the duty by input setting of the luminance is 255/255, namely, 100 % (S2). When, the preset value of the duty is 255/255, the operation is continued with the duty value as it is. To the contrary, when the preset value of the duty is not 255/255, 1/255 is added, and then, the added result value is output as a preset value of the duty.

[0013]

On the other hand, in S1, when the preset luminance is not higher than the actual luminance, furthermore, it is judged that whether or not the actual luminance is lower than the actual luminance (S3). When, the preset luminance is not lower than the actual luminance, namely, when the preset luminance is equal to the actual luminance, the operation is continued with the duty value as it is. Additionally, in S3, when the preset luminance is lower than the actual luminance, next, it is judged whether or not the preset value of the duty is 1/255 (S4). When the preset value of the duty is 1/255, the operation is continued with duty value as it is. To the contrary, when the preset value of the duty is not 1/255, 1/255 is subtracted to define the subtracted result value as a preset value of the duty to be output.

[0014]

As described above, in comparison with the case of adjusting by temperature control a difference between emission efficiencies due to temperatures of the cold-cathode tube 4, a much quicker response can be obtained by always detecting an actual luminance of the cold-cathode tube 4 by the optical sensor 13 and controlling an input of the cold-cathode tube 4 to be a preset luminance. Furthermore, this control can realize smaller control error than the temperature control.